CALIFORNIA DIVISION OF MINES AND GEOLOGY

FAULT EVALUATION REPORT FER-166
SUPPLEMENT NO. 1

Ortigalita Fault (northwest segment),
Stanislaus County, California

by
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INTRODUCTION

The purpose of this supplementary report is to verify the location of the Ortigalita fault in the northwestern Crevison Peak quadrangle and adjacent Mustang Peak quadrangle where we previously lacked aerial photographic coverage (Manson, 1985). Specifically, the segment of the Ortigalita fault northwest of Quinto Creek is evaluated here. Manson had recommended zoning the northwestern part of the Cottonwood Arm segment of the fault in the Crevison Peak quadrangle, based on the mapping of Dibblee (1975) and on the association of gross geomorphic features that are apparent on the topographic map. USDA (1950) aerial photographs were subsequently obtained to verify Dibblee's traces and to evaluate a short segment of the fault to the northwest.

LITERATURE REVIEW

Dibblee's (1975) mapping of the Ortigalita fault (Figure 1) is discussed in FER-166 (Manson, 1985). Dibblee showed the fault to separate Franciscan rocks on the southwest from serpentinite and other ophiolitic rocks on the northeast. Schilling (1962) also mapped this segment of the fault, which is somewhat similar to the mapping of Cotton (1972). Both of these workers located the Ortigalita fault along the northeast margin of the ophiolite sequence, which they considered to be part of the Franciscan assemblage of rocks rather than the base of the Great Valley Sequence (Figure 1). Cowan (1982) mapped the Ortigalita fault as a high-angle fault separating Franciscan melange (west) from the Great Valley sequence (east) (Figure 1). The fault is shown to continue northward from the Mustang Peak quadrangle by Cowan (1974), Cotton (1972) and Maddock (1964), who designate the fault as the Tesla-Ortigalita fault. None of these workers provide evidence of Quaternary displacement along the Tesla-Ortigalita fault, although Cowan (p. 1631) considered the fault to be of late Cenozoic age based on its structural relations north of his map area.

AERIAL PHOTOGRAPHIC INTERPRETATION

As indicated above, aerial photographs were not available at the time Manson (1985) evaluated the northwesternmost segment of the Ortigalita fault. The recommended zoning northwest of the Bald Eagle Mine (north of Quinto Creek) was based mainly on the mapping of Dibblee (1975).

The recently obtained USDA photos have been interpreted, revealing that recently active strands of the Ortigalita fault extend northwest of the Bald

Eagle Mine at least as far as the northern margin of the Mustang Peak quadrangle (photo coverage was not obtained north of there). The evidence for recent faulting is summarized on Figure 2. For the most part, the traces mapped lie close to or coincide with the mapping of Dibblee on the Crevison Peak quadrangle and Cowan (1974) on the Mustang Peak quadrangle.

The features portrayed on Figure 2 are typical of those expected for a right-lateral strike-slip fault with a moderate slip-rate. The fault, although somewhat segmented, is mostly well-defined northwest of the center of Section 30 by linear scarps, troughs, and sidehill benches, right-laterally offset drainages, and other features. The presence of ephemeral features, such as sidehill benches and right-laterally offset small drainages, strongly suggest Holocene displacement. The existence of larger geomorphic features (e.g. shutter ridges, right-lateral offset of large drainages) is consistent with significant Quaternary displacement. Garzas and Quinto Creeks both appear to be offset about 6 km. Intermediate-sized drainages (e.g., in Sections 13, 19 and 30) are offset hundreds of meters.

CONCLUSIONS

Interpretations of aerial photographs verify the existence and recency of the Ortigalita fault for a distance of 8 km northwest of Quinto Creek. Well-defined geomorphic features strongly suggests that the fault has had significant right-lateral displacement during Holocene and Pleistocene times -- possibly as much as 6 km. The activity and sense of displacement are consistent with segments of the Ortigalita fault evaluated to the southeast (Manson, 1985). The recently active traces mapped herein are similar in location to the principal traces mapped by Dibblee (1975) and Cowan (1974) (Figures 1 and 2). The Ortigalita fault extends northward from the Mustang Peak quadrangle as a major structural feature (referred to as the Tesla-Ortigalita fault by Cowan 1974; Maddock, 1964; Cotton, 1972), but no evidence is available that documents recent displacement. Photo coverage was not obtained for the area north of the Mustang Peak quadrangle as that area is remote and undeveloped.

RECOMMENDATIONS

Evidence observed on aerial photographs indicates that the Ortigalita fault meets the criteria of "sufficiently active and well defined" (Hart, 1980) and should be zoned northwest of Quinto Creek in the Crevison Peak and Mustang Peak quadrangles. The traces used for zoning are shown on Figure 2 of this supplement. The work of Dibblee (1975) and Cowan (1974) also should be used as confirming references in the Crevison Peak and Mustang Peak quadrangles, respectively.

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